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| UHLIR, NIKOLAS J |

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Please find below and/or attached an Office communication concerning this application or proceeding.

A 16

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/581,447 | MURATA ET AL. | |
| | Examiner | Art Unit | |
| | Nikolas J. Uhlir | 1773 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *05 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,3-5 and 7-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) *none* is/are allowed.

6)☒ Claim(s) *1,3-5 and 7-13* is/are rejected.

7)☒ Claim(s) *1,3-5,7-9 and 13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☒ Interview Summary (PTO-413) Paper No(s). *16* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

1. This office action is in response to the amendment/request for continued examination (RCE) dated 3/05/03. The applicant's amendment/arguments are sufficient to overcome the prior 35 U.S.C 112 rejections of claims 7-9 and 13, and the prior 35 U.S.C 103(a) rejections of claims 1, 3-5, 7-9 and 13. Accordingly, these rejections are withdrawn.

### *Specification*

2. The amendment filed 02/05/03 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Page 11, line 9, and page 23, line 3, "X refers to a component, excluding isocyanate groups, from an isocyanate compound." This language is extremely broad, as it allows for X to be anything, including inorganic compounds. The applicant does not have support for such language in the disclosure as originally filed. The applicant on page 13 paragraph 1 lists suitable isocyanate compounds for use in the formation of the urethane acrylate, which are exclusively organic isocyanates. Thus, applicant's language constitutes new matter because it includes compounds that were not described in the original disclosure as suitable. The examiner respectfully suggests the applicant replace this language with "X is a residue of an organic isocyanate compound" to overcome this objection. Such an amendment is supported by the examples in the specification.

Applicant is **required** to cancel the new matter in the reply to this Office Action.

### *Claim Obj ctions*

3. Claim 11 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 10. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). In the instant case, claim 11 requires the titanium oxide particles to have a rutile type crystal structure, which is already required by claim 10, upon which claim 11 is dependent.

### *Claim Rejections - 35 USC § 112*

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 3-5, 7-9 and 13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In the instant case, the applicants in claims 1 and 13 require X to "refer to a component, excluding isocyanate groups, from an isocyanate compound." This language is extremely broad and allows for X to be anything, including inorganic compounds. As discussed above in the objection to the specification, the original disclosure provides support for X being a residue of an organic

isocyanate compound, but does not provide support for compounds that are not organic. Thus, this limitation constitutes new matter. Correction is required.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 7-9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka et al. (US5747152) in view of Ishii et al. (JP10017632).

8. It is noted that a copy of the Oka and Ishii patents accompanied a prior office action and so have not been include with this action.

9. The limitations of claim 13 require an antireflection material comprising a transparent substrate, a hardcoat layer provide on one or two surfaces of the transparent substrate directly or via another layer, and an antireflection film consisting of one layer or multilayers having adjusted refractive index further provided on a surface of said hard coat layer, wherein the hard coat layer comprises ultrafine particles having a higher refractive index than that of a binder resin for said hard coat layer, and a polymer polymerizing a urethane methacrylate having the formula $\{(CH_2=CR_1COO)_k\text{-}R_2\text{-}O\text{-}CONH\}_l\text{-}X$, where $R_1$ is H or $CH_3$, $R_2$ is a component excluding hydroxyl groups, from a polyhydric alcohol, X is a component, excluding isocyanate groups, from an isocyanate compound, K is an integer from 1-5 and I is an integer from 1-3, wherein I and K cannot both be 1.

10. The examiner has interpreted claim 13 to require that X be a residue of an organic isocyanate compound, as is supported by the examples in the specification.

11. With respect to these limitations, Oka et al. teaches an antireflection film comprising a transparent substrate, a hard coat formed on the transparent substrate, and a secondary coating (equivalent to applicants claimed antireflection layer) deposed on the hard coat layer, wherein the secondary coating has a lower refractive index then the hard coat layer (column 11, line 45-column 13, line 65). Oka et al. teaches that UV curable resins containing acrylate functional groups are suitable for use as the binder resin for the hard-coat layer. Urethane acrylates are preferred (column 13, lines 23-25 and column 13, lines 48-51). This antireflection film is typically utilized as a coating on eyeglass lenses (column 2, lines 49-56)

12. Further, Oka et al. teaches that the hard coat layer contains ultra fine particles having a high refractive index (column 12, lines 1-13). Examples of these particles include ZnO (n=1.9), and $TiO_2$ (n=2.3-2.7) (column 11, lines 55-67, and column 21, lines 59-67). Oka et al. defines "ultrafine particles" as particles having an average diameter not more than 200nm, preferably between 5-70nm (Column 12, lines 17-22).

13. Therefore it would have been obvious to one of ordinary skill in the art to utilize ultrafine ZnO or $TiO_2$ particles as the ultrafine particles in Oka, as they are recognized to be equivalent to the other materials listed as suitable for use as the particles.

14. Oka et al. fails to teach a hardcoat composition comprising a urethane methacrylate having formula recited in claim 13.

15. However, with respect to this deficiency, Ishii teaches a urethane methacrylate that is suitable for use as a hardcoat on ophthalmic lenses (section 33), wherein the urethane methacrylate is formed by reacting a diol compound having a fluorene structure (equivalent to applicants claimed $R_2$ group) with a polyisocyanate compound and a hydroxylated methacrylate compound (abstract). It is the examiners position that the reaction of these components will proceed as follows:

$$HO\text{-}R_2\text{-}OH + X(OCNH_2)_2 + CH_2=C(R_1)COOH \rightarrow (CH_2=C(R_1)COO)\text{-}O\text{-}R_2\text{-}O\text{-}(CONH)\text{-}X$$

Where $HO\text{-}R_2\text{-}OH$ represents the polyhydric alcohol described by Ishii, $X(OCNH_2)_2$ represents the polyisocyanate compound described by Ishii, and $CH_2=C(R_1)COOH$ is an acid of a hydroxylated methacrylate compound (i.e. methacrylic acid) utilized by Ishii. It is the examiners position that the final product of these three reactants results in a product that meets the formula limitations of claim 13, with k equal to 1 and l equal to 2 or more (to react all of the isocyanate groups of the polyisocyanate). Furthermore, Ishii teaches that this urethane acrylate is used as a hardcoat for ophthalmic lenses (section 33).

16. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the urethane methacrylate taught by Ishii as the hardcoat for the ophthalmic lens taught by Oka, in light of the fact that Oka teaches that Urethane methacrylates are particularly preferred for use as the hardcoat compounds, and the fact that the urethane acrylate of Ishii is specifically taught to be suitable for use as a hardcoat for an ophthalmic lens.

17. Regarding the requirement in claim 13 that the particles have a higher refractive index then their binder. Ishii teaches that the urethane acrylate has a refractive index of ~1.58 (page 6 of the original Japanese, Table 1, line 14). ZnO and $TiO_2$ have refractive indexes of 1.9 and 2.3-2.7 respectively. Thus the limitations of claim 13 are met.

18. The limitations of claim 7 require the ultrafine particles to have a particle size of 30nm or less. Oka et al. teaches that the ultrafine particles in the hardcoat layer have a particle size between 5-200nm, preferable 5-70nm, as stated above for claim 13. 5nm is completely encompassed within the applicants claimed range. Thus, the limitations of claim 7 are met when 5 nm particles are utilized.

19. Claim 8 requires the antireflection material to have a critical surface tension of 20 dynes/cm or less. Although Oka does not explicitly teach this property, Oka et al. does teach that suitable materials for the low refractive index secondary layer include LiF (n=1.4), $MgF_2$ (n=1.4), $AlF_3$ (n=1.4), and particles thereof (column 12, line 13 and column 22, lines 50-55). These materials exactly match the materials specified by the applicant on page 35 of the specification as suitable secondary layer materials that possess this property. Thus, in light of these similarities, the examiner takes the position that the critical surface tension limitation is met.

20. Claim 9 requires a polarization film wherein a protecting layer is laminated on the opposite side of the surface of the transparent substrate of the antireflection material of claim 13, wherein the hardcoat layer and antireflection layer are provided via a polarization substrate. Oka et al. teaches adhesively bonding a polarization element to the bottom of the antireflection film. Further, Oka et al. teaches applying a triacetyl

cellulose layer (29) to the bottom of the polarization element (column 31, lines 38-47). It is the examiners position that this triacetyl cellulose layer will provide protection to the polarization layer to some degree simply by being present. Thus, the limitations of claim 9 are met.

21. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka (US5747152) in view of Morita (US4735869).

22. A copy of the Morita patent accompanied a prior office action and so is not included with this action.

23. Claim 10 requires an antireflection material that comprises a transparent substrate, a hardcoat on one or both surfaces of the substrate directly or via another layer, an antireflection film further provided on the surface of the hardcoat, wherein the hardcoat comprises a radiation and/or thermosetting resin and titanium oxide fine ultrafine particles that are surface treated by a an oxide or hydroxide of at least one element selected from the group consisting of silicon, zirconium, aluminum, tin, and cesium, wherein the titanium oxide has a rutile type crystal structure.

24. Regarding these limitations Oka et al. teaches an antireflection film comprising a transparent substrate, a hard coat formed on the transparent substrate, and a secondary coating (equivalent to applicants claimed antireflection layer) deposed on the hard coat layer, wherein the secondary coating has a lower refractive index then the hard coat layer (column 11, line 45-column 13, line 65). Oka et al. teaches that UV curable resins containing acrylate functional groups are suitable for use as the binder

resin for the hard-coat layer. Urethane acrylates are preferred (column 13, lines 23-25 and column 13, lines 48-51).

25. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a UV curable resin containing acrylate functional groups as the resin of the hardcoat in Oka, as this material is recognized to be equivalent to the other materials cited as suitable for this purpose.

26. Further, Oka et al. teaches that the hard coat layer contains ultra fine particles having a high refractive index (column 12, lines 1-13). Examples of these particles include ZnO (n=1.9), and $TiO_2$ (n=2.3-2.7) (column 11, lines 55-67, and column 21, lines 59-67). Oka et al. defines "ultrafine particles" as particles having an average diameter not more than 200nm, preferably between 5-70nm (Column 12, lines 17-22).

27. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize ultrafine titanium oxide particles as the ultrafine particles in the binder of Oka, as $TiO_2$ is recognized to be equivalent to the other materials cited as suitable for use as the ultrafine particles.

28. Regarding the limitation in claim 10 requiring the $TiO_2$ particles to be surface treated with an oxide or hydroxide of one of the elements cited, Oka et al. teaches that the ultrafine particles may be coated with a layer of colloidal silica (equivalent to silicon oxide) to render them highly hydrophobic, thereby increasing the adhesion of the particles to the binder resin (column 12, lines 36-50).

29. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the $TiO_2$ particles of Oka with a layer of Colloidal silica in order to improve the adhesion of the particles to the binder resin.

30. Oka does not teach the use of rutile type titanium oxide particles as required by claim 10.

31. However, Morita teaches that rutile type titanium dioxide has a higher refractive index then anatase type titanium dioxide.

32. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use the rutile titanium dioxide as the ultrafine particles used in the hardcoat layer taught in Oka et al.

33. One would have been motivated to make such a modification due to the higher refractive index of rutile titanium dioxide one would expect to gain as opposed to anatase type titanium dioxide.

34. The examiner acknowledges that neither Oka et al. nor Morita explicitly states that rutile type titanium dioxide is suitable for use in antireflection materials. However, Oka et al. discloses a range of refractive indices for ultrafine $TiO_2$ in column 21, lines 63-64, indicating that the refractive index chosen is variable. Morita shows that rutile type $TiO_2$ can achieve a higher refractive index then anatase $TiO_2$. Thus, there is motivation to use rutile $TiO_2$ as opposed to anatase $TiO_2$ when very high refractive index is required in the hard coat layer.

35. Regarding the limitations of claim 11, these limitations are met as set forth above for claim 10.

36. Claim 12 requires a polarization film wherein a protecting layer is laminated on the opposite side of the surface of said transparent substrate of said antireflection material of claim 10 in which said hard coat and said antireflection film are provided, via a polarization substrate.

37. Oka et al. teaches adhesively bonding a polarization element to the bottom of the antireflection film, as shown by figure 19 (column31, lines 21-47). Further, Oka et al. teaches applying a triacetyl cellulose layer (29) to the bottom of the polarization element (column 31, lines 38-47). It is the examiners position that this triacetyl cellulose layer will provide protection to the polarization layer to some degree simply by being present. Thus, the limitations of claim 12 are met.

***Examiners Note***

38. The examiner respectfully notes that claims 1 and 3-5 are rejected solely under 35 U.S.C 112 1st paragraph as a result of the particular language utilized by the applicant to define component X. The examiner respectfully suggests that replacing the current language with "where X is a residue of an organic isocyanate compound" is sufficient to overcome this rejection and would render claims 1 and 3-5 allowable. This language is supported by examples in the instant specification, wherein reacting a polyol with a mono or polyisocyanate organic compound forms the specified urethane acrylate.

39. Furthermore, the examiner respectfully suggests the applicant consider changing the language "comprises a polymer copolymerizing at least a" in line 5 of claim 1 to "comprises a copolymer of at least a." The language "a polymer copolymerizing" is

confusing, as it could be read to mean that the applicant requires a polymer that copolymerizes a urethane acrylate and the fluorene acrylate, as opposed to the actual final product, namely a copolymer of a urethane methacrylate and an acrylate having a fluorene structure.

***Response to Arguments***

40. The applicants' arguments and amendments dated 2/05/03 have been considered but are not persuasive. The applicants' arguments with respect to the 35 U.S.C 103(a) rejection of claims 1 and 3-5 are moot, as this rejection has been withdrawn. The applicants amendment to claim 1 to require claim 1 to be a copolymer of a fluorene methacrylate and a urethane acrylate of the specified structure is sufficient to define the claimed invention over the prior art.

41. The applicant's arguments with respect to claims 10-12 have been considered but are not persuasive in light of the new grounds of rejection of these claims. The combination of Oka with Morita clearly teaches the limitation of claim 10 wherein the applicant requires $TiO_2$ particles having a rutile type crystal structure.

42. The applicants arguments with respect to the rejection of claims 13 and 7-9 has been considered but is not persuasive in light of the new grounds of rejection applied to these claims. The urethane methacrylate of Ishii meets the structure of claim 13 when L is 2 and k is 1, and is taught to be suitable for use as a hardcoat for ophthalmic lenses. Oka teaches that a hardcoat for an ophthalmic lens is preferably a urethane methacrylate. Thus, there is clear motivation to utilize the urethane acrylate of Ishii as the hardcoat of Oka. Regarding applicants argument of unexpected results, the fact that

applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikolas J. Uhlir whose telephone number is 703-305-0179. The examiner can normally be reached on Mon-Fri 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on 703-308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-0389.

nju
May 8, 2003

Paul Thibodeau
Supervisory Patent Examiner
Technology Center 1700